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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,774	07/07/2005	Pierre Barberis	1298/10025	1671

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EXAMINER	
SHEVIN, MARK L	

ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/541,774	BARBERIS ET AL.	
	Examiner	Art Unit	
	Mark L. Shevin	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-20* is/are rejected.

7)☒ Claim(s) *18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 11-20, filed October 31st, 2008 are pending.

Acknowledgement of RCE

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 31st, 2008 has been entered.

Status of Previous Rejections

3. The previous rejections of claims 11-16 and 18-20 under 35 U.S.C. 103(a) over **Sabol** (EP 0.085.553) have been withdrawn in view of the amendments to claim 11.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. The previous rejection of claim 17 under 35 U.S.C. 103(a) over **Sabol** (EP 0.085.553) in view of **Armand** (US 4,108,687) has been withdrawn in view of the amendments to claim 11.

Claim Rejections - 35 USC § 112 (1st paragraph)

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. **Claims 11-20** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The new limitation of "wherein β quenching does not occur between the first and second forging stage;" is not supported in the instant specification. The instant specification appears to teach the opposite at p. 8, lines 5-10 in that the "the intermediate product 3' obtained from the first forging stage in the α+β phase can be subjected to a cooling stage of any type." Although at p. 8, lines 12-15 states that "in the case where the two forging stages are performed in the α+β phase, the product temperature can be maintained between the two forging stages.", independent claim 11 does not require the second forging stage to be conducted in the α+β phase, and thus does not preclude a quenching step.

Claim Objections

6. **Claim 18** is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form, or rewrite the claim in independent form.

Claim 11 specifies that the semi-finished zirconium product contains at least 97 wt% Zr, thus *at most* 3 wt% of other elements such as Sn, Fe, Cr, Ni, O, Nb, V, and Si

whereas dependent claim 18 states the opposite in that the product formed by claim 11 now need have *at least* 3 wt% of other elements Fe, Cr, Ni, O, Nb, V, and Si.

Claim Rejections - 35 USC § 103

7. **Claims 11-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Sabol** (EP 0.085.553) in view of **Van Swam** (US 5,835,550).

Sabol

Sabol, in his background section, teaches that nuclear grade Zircaloy (Zr-Sn) alloy products are made by producing an ingot (ingots are, by definition, cast [Oxford English Dictionary: "A mass of cast metal...]) having a diameter between 16 and 25 inches, which corresponds to approximately 406 and 635 mm respectively. The ingot is then heated into the beta, *alpha+beta*, or high temperature alpha phase and then worked to some intermediate sized and shaped billet (page 2, lines 4-19). This primary ingot breakdown may be performed by forging, rolling, extruding, or combinations of these methods (p. 2, lines 11-16).

Sabol further teaches that depending on the size and shape of the intermediate product (after first forging step), the billet may be alpha worked and then forged to a size and shape appropriate for extrusion (page 2, lines 25-29).

Sabol's semi-finished products may be tubes intended to be sent to a tube mill for final processing (p. 3, lines 1-7).

Overall, Sabol teaches that after a first step of producing an ingot, and then forging this ingot to produce a semi-finished product (intermediate billet, page 2, line 14). Sabol envisages the option of having a single forging step (page 2, lines 12-19;

page 4, lines 6-13). However, Sabol does not teach the specific claim limitations involving the length of the ingot, however one of ordinary skill could attained the claimed size limitations through routine optimization. Furthermore, there are repeated references to later operations as being adjustable or tailored to the size and shape of the ingot billet (page 2, lines 29-35).

Sabol does not specifically teach a two-stage forging process without an intermediate beta quenching or the number of steps or stages entailed by the process of "primary ingot breakdown."

Van Swam

Van Swam, drawn to a process for fabricating a nuclear fuel rod cladding tube (Abstract), discloses a family of zirconium alloys (claim 1) for use in his inventive processing method consisting essentially of 0.3 - 1.8 wt% Sn, 0.1-0.65 wt% Fe, and the balance Zr where the ingot is heated to a temperature in the beta range and then completed in the alpha+beta or alpha range in one or a multiple of steps (col. 8, lines 54-67). The family of Zr alloys may also contain up to 0.015 wt% Si, 0.005-0.02 wt% C, and 0.09-0.22 wt% O (col. 8, lines 39-53).

The cast ingots of Zr alloy are made into structural parts for reactor service or into hollow tubes for fuel rod cladding (col. 8, lines 59-61).

Regarding claims 11, 16, and 17, it would have been obvious to one of ordinary skill in zirconium ingot processing, at the time of the invention, to cast a Zr alloy of at least 97 wt% Zr with a diameter of 400-700 mm and a length or 2-3 m, forge it in two stages where the first stage is performed at an alpha+beta temperature and the second

at an alpha+beta or alpha temperature without an intermediate quenching step, followed by extrusion or hot rolling as Sabol taught that nuclear grade Zircaloy (Zr-Sn) alloy products are made by producing an ingot (ingots are, by definition, cast [Oxford English Dictionary: "A mass of cast metal...]) having a diameter between 16 and 25 inches, which corresponds to approximately 406 and 635 mm respectively. The ingot is then heated into the beta, *alpha+beta*, or high temperature alpha phase and then worked to some intermediate sized and shaped billet (page 2, lines 4-19). This primary ingot breakdown may be performed by forging, rolling, extruding, or combinations of these methods (p. 2, lines 11-16). Sabol further teaches that depending on the size and shape of the intermediate product (after first forging step), the billet may be alpha worked and then forged to a size and shape appropriate for extrusion (page 2, lines 25-29). However, Sabol does not teach the specific claim limitations involving the length of the ingot, however one of ordinary skill could attained the claimed size limitations through routine optimization. Furthermore, there are repeated references to later operations as being adjustable or tailored to the size and shape of the ingot billet (page 2, lines 29-35). One would then be motivated to look to Van Swam to determine the number of steps or stage in the primary ingot breakdown process of Sabol as Van Swam is drawn to a similar Zr-base alloy for nuclear structural components such as tubing, features alpha+beta forging with later extrusion and rolling, and teaches that nuclear fuel tubular cladding can be made by one or more forging steps in the alpha+beta or alpha range.

Regarding claims 12-15, the amount of alpha phase present in the billet during forging can be easily optimized through routine optimization and by consulting a phase diagram that is well known to metallurgists. The temperature range at which a given zirconium alloy will contain both the alpha and beta phase will vary depending on the alloy composition, and the temperature range can be select by routine optimization depending on the alloy used.

Regarding claim 18, one of ordinary skill in the metallurgical arts would have a reasonable expectation of success in carrying out the claimed process with a more heavily alloyed zirconium ingot as this would not affect the claimed aspects of the ingot production and forging steps. Neither the alloy nor the broad process would be effected -- e.g. if a beta phase stabilizer were added, then the forging temperature could be changed, as long as it is took place in the alpha+beta phase field. Furthermore, Charquet teaches that his process relates to the production of a flat product (sheet) using a zirconium alloy with 0.5 – 2.0% Sn and with possible supplementary additions of niobium and vanadium. From these additional, one can surely envision the process being carried out on an alloy with more than 3% of additive elements.

Regarding claims 19-20, further specifying intended use does not patentably distinguish these claims over the teachings of Sabol. Sabol teaches that Zircaloy materials may be used as tubular cladding for fuel pellets (p. 2, lines 20-21) and it is clear that these materials are used in nuclear reactors. Furthermore, Van Swam taught that the alloys and processing method of his invention were used to make structural parts for reactor service or hollow tubes for fuel rod cladding (col. 8, lines 59-61). One

of ordinary skill would also be motivated to produce a bar per instant claim 20 for the same reasons as manufacturing a tubular product.

Response to Applicant's Arguments:

8. Applicant's arguments filed October 31st, 2008 have been fully considered but they are not persuasive.

Applicants assert (p. 4, last paragraph - p. 5, para 2) that Sabol does not teach or show "wherein β quenching does not occur between the first and second forging stage" and that Sabol quenches after the initial forging at shown at p. 2, lines 11-16.

In response, while Sabol does not specifically teach a two-stage forging process without an intermediate beta quenching or the number of steps or stages entailed by the process of "primary ingot breakdown", the primary ingot breakdown step may be performed by forging, rolling, extruding, or *combinations* of these methods (p. 2, lines 11-16). Combinations of these methods is interpreted to mean one or multiple forging steps in view of Van Swam, which is directed processing similar Zr-base alloys for nuclear reactor service.

Applicants' assertions (p. 5, last paragraph - p. 7) are moot in view of the withdrawal of rejections using Armand.

Pertinent Prior Art

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Komatsu—US 4,992,240

Van Swam – US 5,838,753

Rozhdestvenskiy – US 2004/0139781 A1

Conclusion

-- Claims 11-20 are rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1793

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

January 5th, 2009
10-541,774